



What is typical?

Instructions

The following article was written by Jessica Green for the school newsletter. She has used the random sampler to take a sample of 100 Australian Year 8 boys. Jessica is not known for attention to detail and often makes mistakes.

Year Eight Boys Are Interesting. by Jessica Green

The data from a survey of Australian students has just been released. Students from all over Australia answered a series of questions about themselves. We can now have a look at what they said.

I was interested in writing this article about boys my age, so I took a sample of 100 Year 8 boys from the CensusAtSchool Random sampler.

The average time it takes for Year 8 boys to get to school is 21 minutes. The longest time was 80 minutes. The shortest time was 0 minutes. Most boys took 20 minutes to get to school, and the median is also 20 minutes.

I was surprised to find that the vast majority of the Year 8 boys did speak a language other than English at home. This is because most of Australia is like our school, an inner city suburb with a high number of migrant families.

The older boys have more jobs than younger boys.

Other interesting facts are that 60% have their own mobile phone. 5% were born in September. The average height of a year 8 boy is 168 cm and they have 3 pets each.

Task One: Length of time for travelling to school

- 1.** Look at Jessica's observations on travel time. Do you have a strong feeling as to whether or not her statements are correct? Why?

There is no reason to doubt Jessica's claims, they seem within legitimate bounds (For example, we would doubt an answer if it

said students took on average 120 minutes to get to school). And we already have ideas of time frames for this data from our own experiences of travelling to and from school.

You do not have access to Jessica's data to check her claims, but you can take a random sample to investigate travel times of students to school.

- 2.** Go to the CensusAtSchool [Random Sampler](#) and request a sample of Year 8 boys. The sample size is for you to choose (suggest at least 100).

- 3.** Construct a summary table that shows the mean (average), median (middle value), mode (most common number), maximum and minimum values for time that students take to travel to school.

(Hint: It will be easier if you sort the data from smallest to largest values first using the SORT function in Excel. If you're good with Excel, you can also use the MEAN, MEDIAN, MODE, MAX and MIN functions.)

AVERAGE	23
MAX	95
MIN	2
MEDIAN	20
MODE	10

Teacher Note: These results are from random sample of year 8 boys. Students'

- 4.** Are the values associated with your sample similar to those of Jessica? Suggest reasons for this.

Each analysis will differ from sample to sample. Expect similar but not identical results. The average time for students to travel to school is very similar, Jessica's sample was twenty-one minutes, and the random sample was twenty-three minutes.

The maximum travel time has increased by fifteen minutes, from eighty minutes in Jessica's sample to ninety-five minutes in the random sample. This reflects that some students live far away from school, such as rural areas, a private school or government school with no enrolment boundaries.

The minimum travel time of zero minutes for Jessica's sample was similar to two minutes for the random sample. This could indicate that boarders live on school grounds, or some students live across the road from the school. Since do not know how

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many students in the same sample took zero minutes to travel to school, it's difficult to speculate.

The median or middle numbers are the same in both sets of data, of twenty minutes. The most common time that students take to travel to school is twenty minutes for Jessica's sample, and ten minutes for the random sample. This may reflect that the largest group of students live around the area of the school. We do not know whether students take twenty minutes by car or to walk.

- 5.** Compare the findings from your sample to those of your classmates (who have collected a different simple random sample). Are they similar?

Although all random samples sets are different and unique they should be similar to one another if the samples were taken from Australia wide. (If the postcodes were from 0000 – 9999)

- 6.** Comment on the accuracy of the other information Jessica provided in the article. Remember that Jessica has based her article on one simple random sample.

Jessica refers to the "vast majority" of year eight boys speaking a language other than English at home. Data analysis from the random sampler shows only twenty-six percent of students speaking a language other than English at home, suggesting Jessica's statement false. Further to this, Jessica attributes her false claim to the suburb her school is in, but her sample was a random sample taken from CensusAtSchool and includes students from all over Australia.

While it might be possible that younger boys tend to work more than older boys. Jessica's statement is questionable as she only sampled year eight boys, so the phrasing 'older' and 'younger' boys is misleading and not very meaningful.

Jessica claims that sixty per cent of students have their own mobile phone. Analysis of the random sample shows that seventy per cent of students have their own mobile phone. Since these two numbers are similar, Jessica's statement about mobile phones could be true.

The average height was similar, Jessica's sample was one-hundred and sixty-eight centimetres, and the random sample was one hundred and sixty centimetres. Jessica's statement is true.

Although the CensusAtSchool Questionnaire has questions about pets, it does not detail how many pets students have, so Jessica's claims of students having three pets each is false. In

addition, the language Jessica uses of “and they have 3 pets each” is ambiguous. We do not know whether this is an average, or a mode, or whether she refers to only students who are one hundred and sixty-eight centimetres.

- 7.** Suggest ways that you could make your data more accurate.
Accuracy can be improved with larger data samples.

Task Two: Investigating Jessica’s other work

- 8.** Work together with the rest of your classmates to conduct a survey of your class and compare this to the data from the random sampler. Is your class a typical Australian class? Explain.

Focus on differences and similarities in the data. Suggest reasons.

- 9.** Find out how to make a box and whisker plot. Use the information you’ve gathered to create two box and whisker plots, one for the random sample and the other for your class data. Compare the two plots, and write a report of your findings.